USEFUL FOR UNIVERSITY EXAMS, GATE, NET AND OTHER CS EXAMS

DATABASE MANAGEMENT SYSTEM

PROPER NOTES IN PPT FORM

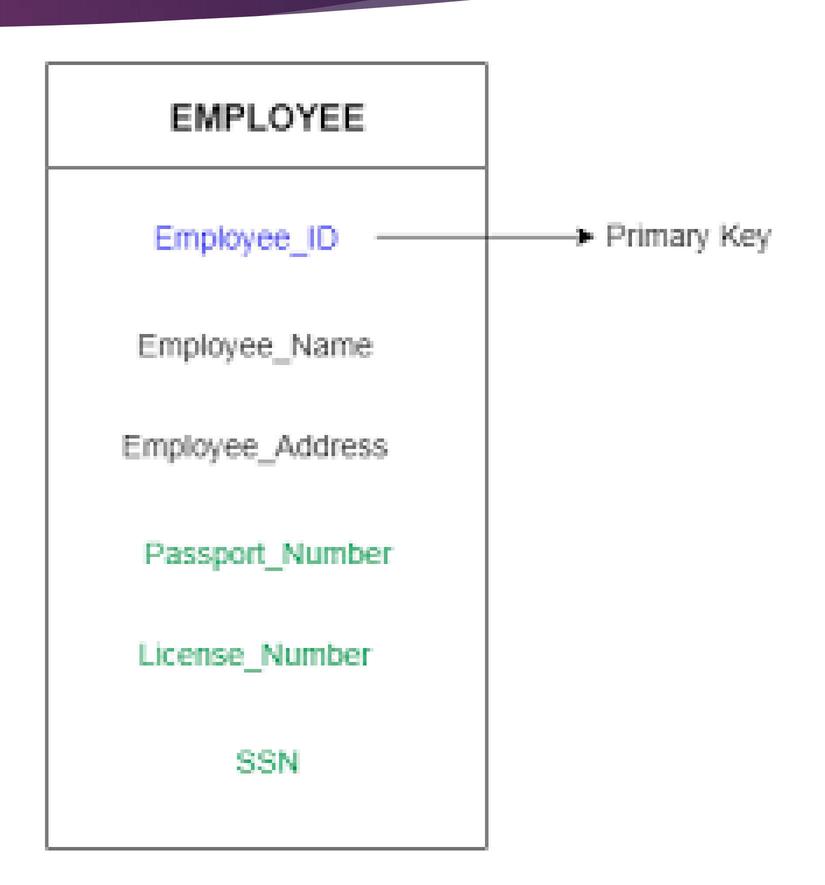
DATABASE KEYS

PART -8



KEYS

- Key is used to uniquely identify any record or row of data from the table.
- It is also used to establish and identify relationships between tables.
- For example, Registration Number or Roll Number is used as a key in the Student table because it is unique for each student.



SUPER KEY

- Super key is an attribute set that can uniquely identify a tuple.
- Super key is nothing but a set of keys that can uniquely identify the tuples or rows of a table. So, all the keys present in the super key super-set are capable of uniquely identifying all the other attributes or columns of the table.
- Suppose a table has 5 columns or attributes namely- A, B, C, D, E.
- And the given super keys of the relation is: {ABC, AB, DE}
- Since ABC is a super key, we can say that ABC can identify all other attributes of the table, i.e., ABC can identify A, B, C, D, E. Similarly, AB can also identify A, B, C, D, E; and DE can also identify A, B, C, D, E.
- Now, among the super keys, the candidate key can be only AB and DE. The reason why we have not considered ABC to be a candidate key is that ABC contains redundant attributes. ABC has redundant attributes because only AB is capable of identifying all the other attributes of the table so we do not need the C attribute.

Emp_SSN	Emp_Id	Emp_name	Emp_email
11051	01	John	john@email.com
19801	02	Merry	merry@email.com
19801	03	Riddle	riddle@email.com
41201	04	Cary	cary@email.com

Set of super keys obtained

{ Emp_SSN }

{ Emp_Id }

{ Emp_email }

{ Emp_SSN, Emp_Id }

{ Emp_Id, Emp_name }

{ Emp_SSN, Emp_Id, Emp_email }

{ Emp_SSN, Emp_name, Emp_Id }

CANDIDATE KEY

- A candidate key is an attribute or set of attributes that can uniquely identify a tuple.
- A Primary key is determined from the set of candidate keys by the Data Base Administrator.
- Candidate key is a part of the super key that can uniquely identify other attributes of the table. Hence, the candidate key is also known as a minimal super key.
- The candidate key should not have redundant attributes.
- The candidate key of a relation is all the possible ways through which we can identify a row or a tuple.
- A table can have more than one candidate key.

- The main aim or purpose of using the candidate key is that a candidate key ensures that the data inserted in the database should not affect the integrity of the stored data.
- The candidate key makes sure that there is no insertion of duplicate data.
- The candidate key is also known as the minimal super key but we should note one thing, minimal does not mean the smallest. Minimal simply means non-reducible. Hence, if any attribute is removed from the candidate key, then the candidate key will not be able to uniquely identify other attributes of the table.



Student ID	Roll No	First Name	Last Name	Email ID
1	11	Tom	Price	abc@gmail.com
2	12	Nick	Wright	xyz@gmail.com
3	13	Dana	Natan	mno@gmail.com

PRIMARY KEY

- A primary key is a column in a relational database table that's distinctive for each record.
- It's a unique identifier such as a driver's license number, telephone number with area code or vehicle identification number (VIN).
- A relational database must have only one primary key.
- Every row of data must have a primary key value and none of the rows can be null.
- The choice of a primary key in a relational database often depends on the preference of the administrator as more than one column can be a candidate for becoming primary key.

Importance of primary keys

- helps identify unique data, such as a customer ID;
- prevents duplication of records in a table;
- helps with updating or deleting only specific records;
- helps ensure that fields aren't null;
- helps set up relationships between tables; and
- ensures row-level accessibility.

EXAMPLES

- **Student ID.** Students are routinely given a unique ID known as a student ID. Since each student ID is different for each student, it can be used as a primary key for a database table.
- **Driver's license number.** Driver's licenses are examples of primary keys, as they can officially identify each user as a licensed driver and their street address in the Department of Motor Vehicles' database.
- **Vehicle Identification Number (VIN).** A VIN is a good example of a primary key for a relational database for a vehicle registration system, as no two vehicles can have the same VIN.

Alternate Keys

- Out of all the candidate keys in a table one key is selected for primary key. Remaining all keys are known as alternate keys.
- An alternate key is the secondary candidate key that contains all the property of a candidate key but is an alternate option.

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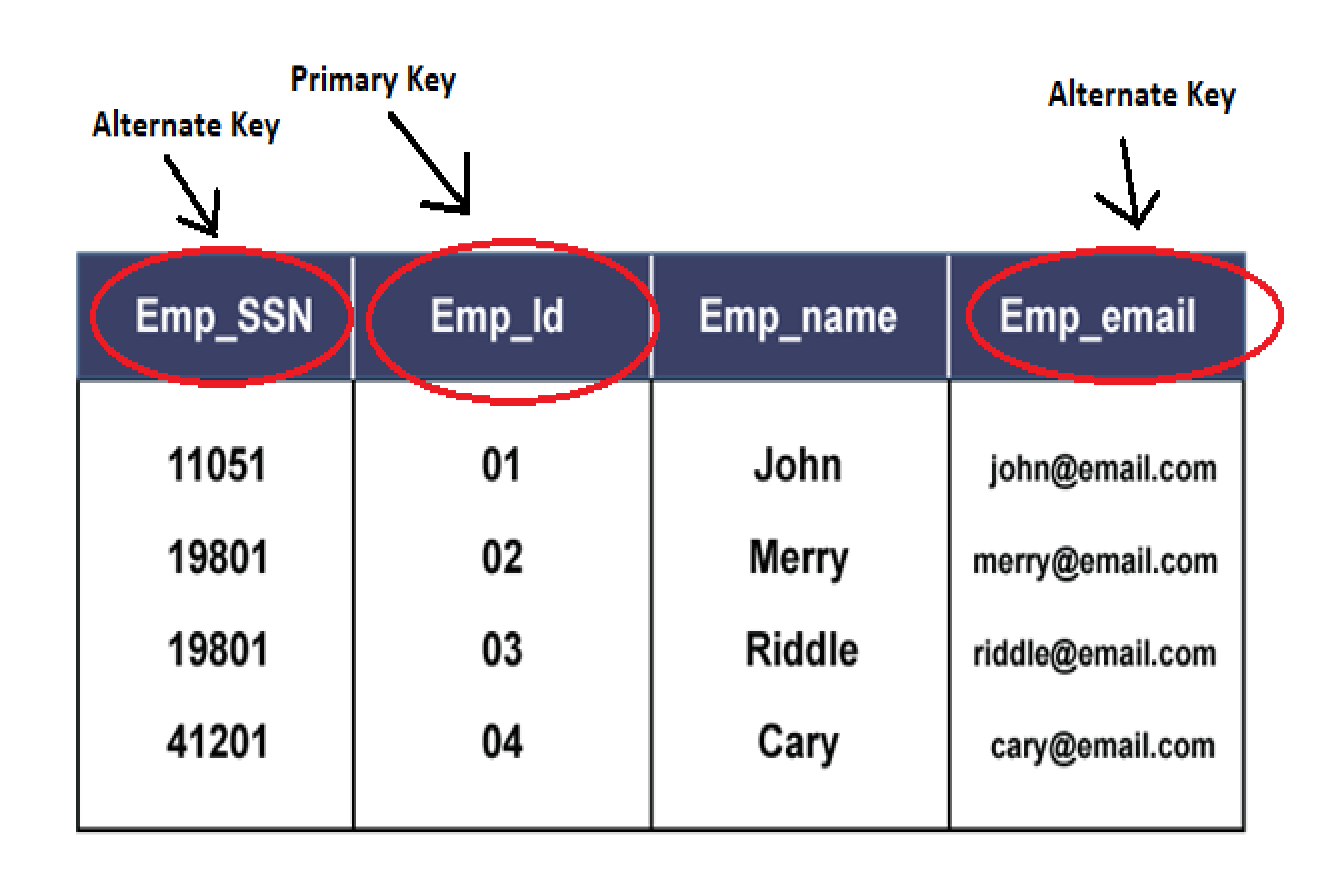
Candidate Keys :

Emp_SSN

Emp_Id

Emp_email

- These are the candidate keys we concluded from the above attributes. Now, we have to choose one primary key, which is the most appropriate out of the three, and it is **Emp_Id**. *So, the primary key is Emp_Id*. Now, the remaining two candidate keys are **Emp_SSN** and **Emp_email**. Therefore, Emp_SSN and Emp_Email are the alternate keys.

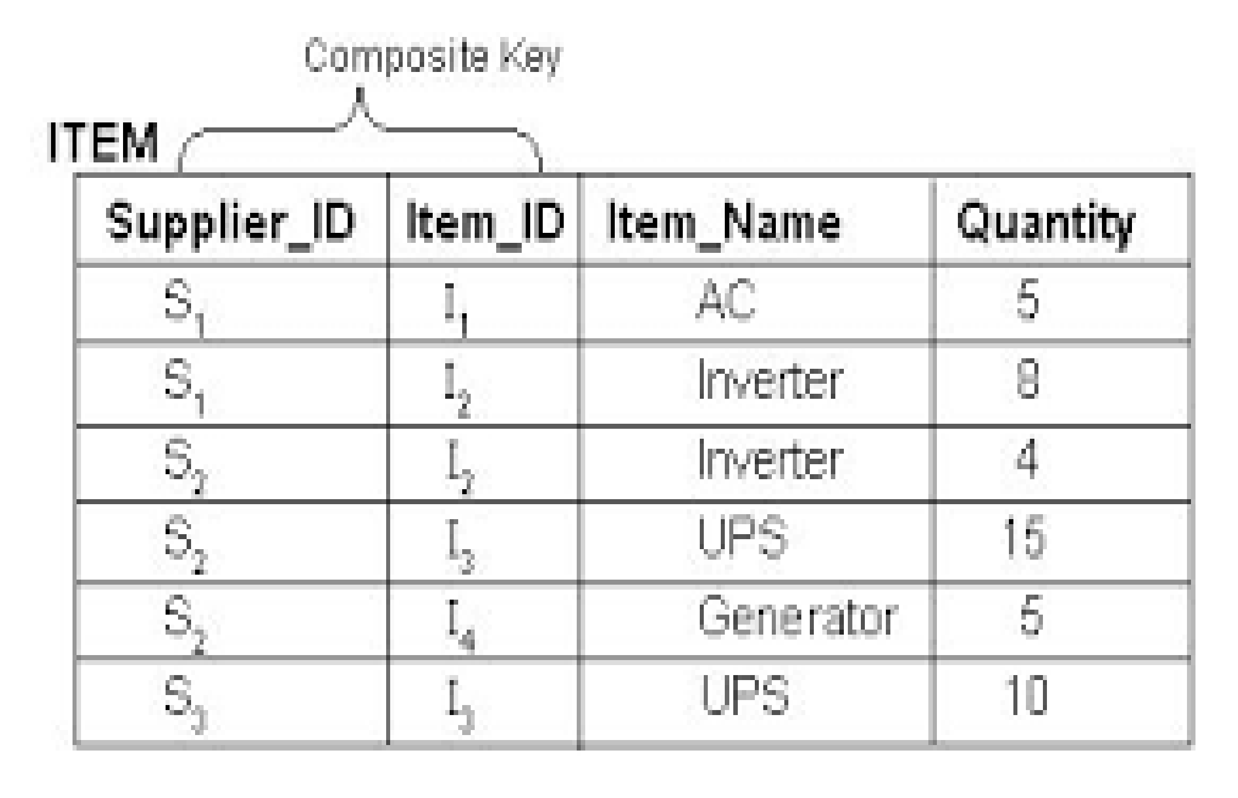


Emp_SSN	Emp_Id	Emp_name	Emp_email
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Composite Keys

- This type of primary key consists of two or more attributes, such as multiple columns.
- The data types of different columns could differ from each other.
- It becomes the composite key when more than a single column is used to uniquely identify each row in the table.

- In this figure, there is not even a single that can uniquely identify a record.
- So, we are going to combine two attributes say Supplier_ID and Item_Id and this will act as a primary key as the comination of these two columns is able to uniquely identify the record.
- Now since this key is made from combination of two attributes/ columns so therefore it is known as composite key.



Composite Key

ITEM

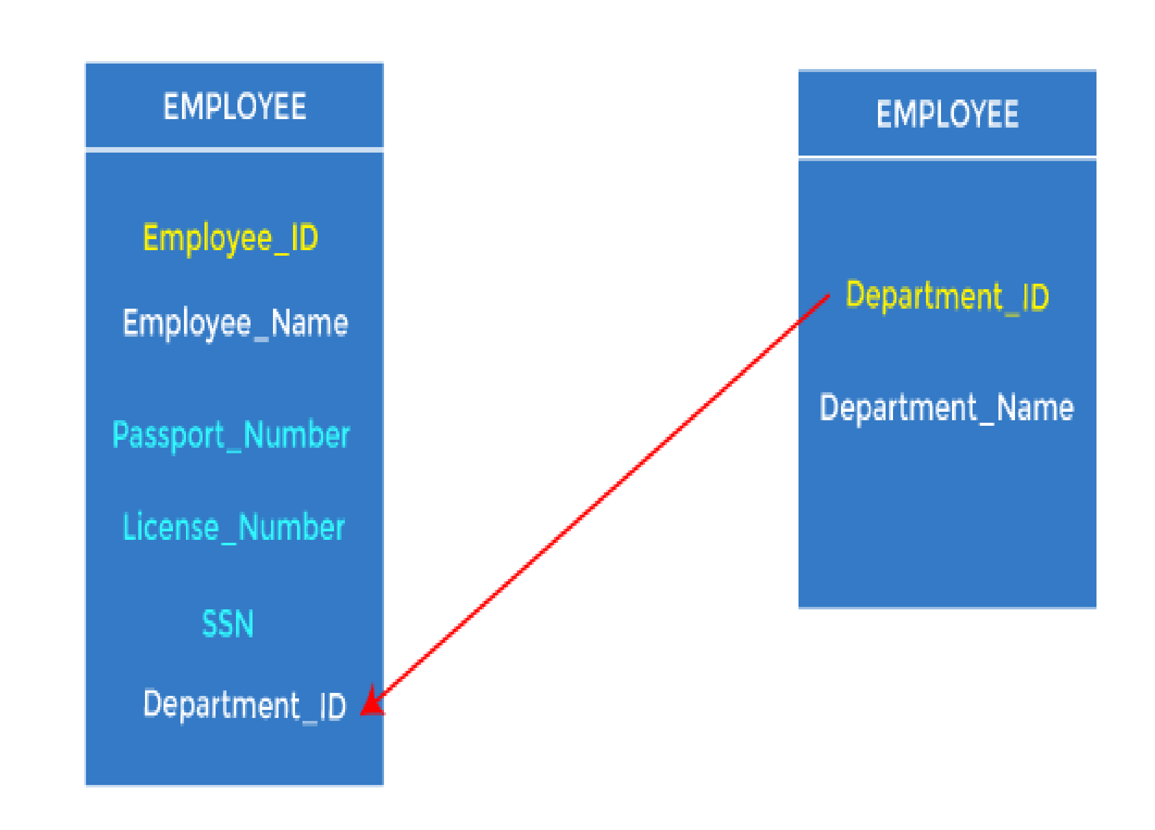
Supplier_ID	Item_ID	Item_Name	Quantity
S_1	I_1	AC	5
S_1	I_2	Inverter	8
S_2	I_2	Inverter	4
S_2	I_3	UPS	15
S_2	I_4	Generator	5
S_3	I_3	UPS	10

Table: 5.5

Foreign Key

- It links two tables together. This means that the foreign key in one table may refer to the primary key of another table.
- There can be more than one foreign key in a table.
- The foreign key column accepts a null value.
- It can make a parent-child relationship in a table.
- Duplicate values can be stored in the foreign key column.

- Every employee works in a specific department in a company, and employee and department are two different entities. So we can't store the department's information in the employee table. That's why we link these two tables through the primary key of one table.
- We add the primary key of the DEPARTMENT table, Department_Id, as a new attribute in the EMPLOYEE table.
- In the EMPLOYEE table, Department_Id is the foreign key, and both the tables are related.



THANK YOU

